

WHAT IS CLAIMED IS:

1. A coated substrate comprising a horticultural substrate wherein the surface of said substrate is coated with a membrane comprised of one or more particulate layers, said layers comprising one or more particulate materials, said particulate materials being finely divided, and wherein said membrane allows for the exchange of gases on the surface of said substrate.
2. The coated substrate of claim 1 wherein said particulate materials are hydrophobic.
3. The coated substrate of claim 1 wherein said particulate material has a Receding Contact Angle of greater than  $90^{\circ}$ .
4. The coated substrate of claim 1 wherein the particulate material has a particle size distribution wherein up to 90% of the particles have a particle size of under about 10 microns.
5. The coated substrate of claim 1 wherein the particulate material comprises a hydrophilic core and a hydrophobic outer surface.
6. The coated substrate of claim 5 wherein said hydrophilic core materials are selected from the group consisting of calcium carbonate, mica, kaolin, bentonite, clays, attapulgite, pyrophyllite, wollastonite, silica, feldspar, sand, quartz, chalk, limestone, diatomaceous

earth, baryte, ceramic, glass and organic microspheres, aluminum trihydrate, ceramic fibers, glass fibers, colorants and titanium dioxide.

7. The coated substrate of claim 5 wherein said hydrophobic outer surface materials are selected from the group consisting of chrome complexes, organic titanates, organic zirconate or aluminate coupling agents, organofunctional silanes, modified silicone fluids and fatty acids and salts thereof.

8. The coated substrate of claim 1 wherein the substrate is selected from agricultural and ornamental crops.

9. The coated substrate of claim 1 wherein the substrate is selected from the group consisting of fruits, vegetables, trees, flowers, grasses, seeds, roots, and landscape and ornamental plants.

10. The coated substrate of claim 1 wherein the finely divided particulate materials have a median individual particle size below about 3 microns.

11. The coated substrate of claim 5 wherein the hydrophilic core particulate materials are selected from the group consisting of calcium carbonate, calcined kaolin and mixtures thereof.

12. A coated substrate comprising a horticultural substrate selected from the group consisting of fruits,

vegetables, trees, flowers, grasses, seeds, roots, and landscape and ornamental plants wherein the surface of said substrate is coated with a membrane comprised of one or more particulate layers, said layers comprising one or more hydrophobic particulate materials, said hydrophobic particulate materials comprising i) a hydrophilic core selected from the group consisting of calcium carbonate, calcined kaolin and mixtures thereof and ii) a hydrophobic outer surface, said particulate materials have a median individual particle size of about one micron or less, and wherein said membrane allows for the exchange of gases on the surface of said substrate.

13. A method for pest control on horticultural substrates which comprises forming on the surface of said substrate a membrane comprised of one or more particulate layers, said layers comprising one or more particulate materials, said particulate materials being finely divided, and wherein said membrane allows for the exchange of gases on the surface of said substrate.

14. The method of claim 13 wherein said particulate materials are hydrophobic.

15. The method of claim 13 wherein said particulate material has a Receding Contact Angle of greater than  $90^{\circ}$ .

16. The method of claim 13 wherein the particulate material has a particle size distribution wherein up to

90% of the particles have a particle size of under about 10 microns.

17. The method of claim 13 wherein the particulate material comprises a hydrophilic core and a hydrophobic outer surface.

18. The method of claim 17 wherein said hydrophilic core materials are selected from the group consisting of calcium carbonate, mica, kaolin, bentonite, clays, attapulgite, pyrophyllite, wollastonite, silica, feldspar, sand, quartz, chalk, limestone, diatomaceous earth, baryte, ceramic, glass and organic microspheres, aluminum trihydrate, ceramic fibers, glass fibers, colorants and titanium dioxide.

19. The method of claim 17 wherein said hydrophobic outer surface materials are selected from the group consisting of chrome complexes, organic titanates, organic zirconate or aluminate coupling agents, organofunctional silanes, modified silicone fluids and fatty acids and salts thereof.

20. The method of claim 13 wherein the substrate is selected from agricultural and ornamental crops.

21. The method of claim 13 wherein the substrate is selected from the group consisting of fruits, vegetables, trees, flowers, grasses, seeds, roots, and landscape and ornamental plants.

22. The method of claim 13 wherein the finely divided particulate materials have a median individual particle size below about 3 microns.

23. The method of claim 17 wherein the hydrophilic core particulate materials are selected from the group consisting of calcium carbonate, calcined kaolin and mixtures thereof.

24. A method for pest control on horticultural substrates selected from the group consisting of fruits, vegetables, trees, flowers, grasses, seeds, roots, and landscape and ornamental plants, which comprises forming on the surface of said substrate a membrane comprised of one or more particulate layers, said layers comprising one or more hydrophobic particulate materials, said hydrophobic particulate materials comprising i) a hydrophilic core selected from the group consisting of calcium carbonate, calcined kaolin and mixtures thereof, and ii) a hydrophobic outer surface, said particulate materials have a median individual particle size of about one micron or less, and wherein said membrane allows for the exchange of gases on the surface of said substrate.

25. A method for enhancing the horticultural effect of horticultural substrates which comprises forming on the surface of said substrate a membrane comprised of one or more particulate layers, said layers comprising one or more particulate materials, said particulate materials

being finely divided, and wherein said membrane allows for the exchange of gases on the surface of said substrate.

26. The method of claim 25 wherein said particulate materials are hydrophobic.

27. The method of claim 25 wherein said particulate material has a Receding Contact Angle of greater than 90°.

28. The method of claim 25 wherein the particulate material has a particle size distribution wherein up to 90% of the particles have a particle size of under about 10 microns.

29. The method of claim 25 wherein the particulate material comprises a hydrophilic core and a hydrophobic outer surface.

30. The method of claim 29 wherein said hydrophilic core materials are selected from the group consisting of calcium carbonate, mica, kaolin, bentonite, clays, attapulgite, pyrophyllite, wollastonite, silica, feldspar, sand, quartz, chalk, limestone, diatomaceous earth, baryte, ceramic, glass and organic microspheres, aluminum trihydrate, ceramic fibers, glass fibers, colorants and titanium dioxide.

31. The method of claim 29 wherein said hydrophobic outer surface materials are selected from the group

consisting of chrome complexes, organic titanates, organic zirconate or aluminate coupling agents, organofunctional silanes, modified silicone fluids and fatty acids and salts thereof.

32. The method of claim 25 wherein the substrate is selected from agricultural and ornamental crops.

33. The method of claim 25 wherein the substrate is selected from the group consisting of fruits, vegetables, trees, flowers, grasses, seeds, roots, and landscape and ornamental plants.

34. The method of claim 25 wherein the finely divided particulate materials have a median individual particle size below about 3 microns.

35. The method of claim 29 wherein the hydrophilic core particulate materials are selected from the group consisting of calcium carbonate, calcined kaolin and mixtures thereof.

36. A method for enhancing the horticultural effect of horticultural substrates selected from the group consisting of fruits, vegetables, trees, flowers, grasses, seeds, roots, and landscape and ornamental plants, which comprises forming on the surface of said substrate a membrane comprised of one or more particulate layers, said layers comprising one or more hydrophobic particulate materials, said hydrophobic particulate materials comprising i) a hydrophilic core selected from

the group consisting of calcium carbonate, calcined kaolin and mixtures thereof, and ii) a hydrophobic outer surface, said particulate materials have a median individual particle size of about one micron or less, and wherein said membrane allows for the exchange of gases on the surface of said substrate.